

CURRICULUM VITAE

JUSTIN ALLEN ZIVIN

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EDUCATION:

1963-1966	University of Wisconsin Madison, Wisconsin
1966-1972	Northwestern University Chicago, Illinois Medical Scientist Training Program
1967	Bachelor of Science
1970	Master of Science Physiology Department Thesis: The effect of perfusion rate of glucose uptake by the isolated rat brain.
1971	Doctor of Philosophy Physiology Department Dissertation: Glucose and 3-hydroxybutyrate uptake by the isolated perfused rat brain.
1972	Doctor of Medicine

INTERNSHIP:

1972-1973

University of Michigan Affiliated Hospitals
Ann Arbor, Michigan
Department of Medicine

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RESIDENCY:

1975-1978

University of California Affiliated Hospitals
San Francisco, California
Department of Neurology

POSITIONS:

1978-1985

University of Massachusetts Medical Center
Worcester, Massachusetts
Departments of Neurology and Pharmacology

1978-1981

Assistant Professor Neurology

1981-1985

Associate Professor of Neurology and Pharmacology

1985-

University of California, San Diego
School of Medicine
Department of Neurosciences
La Jolla, California

Neurology Service, Staff Physician
San Diego Veterans Administration Medical Center

1985-1989

Associate Professor of Neurosciences

1989-

Professor of Neurosciences

1993-2007

Vice Chairman

2012-

Emeritus

LICENSURE:

Medicine:
California 1975—
Massachusetts 1978-1986
Maryland 1973-1975

SAFETY COURSES:

Radionuclide Use:
National Institutes of Health – 1973

Laser System Training:
Photothera – 2011

CERTIFICATION:

National Board of Medical Examiners – 1968, 1972, 1973
American Board of Psychiatry and Neurology – 1979

CLINICAL:

Best Doctors in America – 1996—

ORGANIZATIONS:

American Academy of Neurology
Member – Scientific Issues Committee 1988-1994
Member – Scientific Program Subcommittee 1988-1992
American Board of Psychiatry and Neurology
Examiner – 1991-2004
American Heart Association
Member – Brain, Lung, and Development Research Study Committee 1990-1994
Stroke Council – Executive Committee 1992-1994
California Affiliate – Grant Reviewer 1995-1996
Bugher Foundation Study Group – 1999-2005
American Neurological Association
Member – Membership Committee 1999-2001
American Society for Experimental Neurotherapeutics
Member – Board of Directors 1999-2003
International Society of Cerebral Circulation and Metabolism
National Stroke Association
Member – Research Review Committee 1991-1994
PhRMA – Clinical Advisory Board 2004-2005
Princeton Conference on Cerebrovascular Disease
Principal Organizer – 2002
Society for Neuroscience
China Medical University Hospital - Clinical Trial Center of Excellence Advisory Board.

GRANTS:

“Transcranial Laser Therapy of Ischemic Stroke”
U01 NS069563
PI – Justin Zivin
February 1, 2011 – January 31, 2015

“Novel NMDA Antagonists to Treat Stroke”
VA Merit Review
PI – Justin Zivin
April 1, 2011 – March 31, 2015

RECENT AND CONSULTANT AGREEMENTS:



COMPANIES FOUNDED:

Cerebrovascular Advances, Inc.
Innovative Neurologic Drug Trials, Inc.
Integrated Deficit Examinations, LLC

GOVERNMENT SERVICE:

National Institutes of Health
Neurology A Study Section – Ad Hoc Reviewer 1982-1984
Neurology A Study Section – Member 1984-1988
Neurological Disorders Program Project Review A Committee –
Special Reviewer 1990-1991
Neurological Disorders Program Project Review A Committee –
Member 1991-1995
Training Grant and Career Development Review Committee –
Temporary Member – 1998
Center for Scientific Review – Brain Disorders and Clinical
Neuroscience Working Group – Member 2000
Stroke Progress Review Group – PRG 2001
Neurological Sciences and Disorders K – Chairman 2001 – 2003
Brain Injury and Neurovascular Pathologies – 2005

Food and Drug Administration
Center for Drug Evaluation – Expert 1994-
Neurological Devices Panel – Expert 2001 - 2003

Circulatory Devices Panel – Expert 2002 - 2003
Peripheral and Central Nervous System Drugs Advisory
Committee – Member 1995-1999, 2011-

Department of Veterans Affairs
VA Merit Review Subcommittee for Neurobiology –
Member 1997-2000

EDITORIAL BOARDS:

Experimental Neurology, 1991-
International Journal of Stroke, 2005-
Journal of Neurovascular Disease, 1996-
Journal of Stroke and Cerebrovascular Diseases, 1991-
Medlink, 1998-2001
Neurology, 1995-2003
Neurotherapeutics, 2002-
Stroke, 1990-2005

PUBLICATIONS:

1. Zivin, J.A., Snarr, J.F. *A stable preparation for rat brain perfusion: Effect of flow rate on glucose uptake.* J. Appl. Physiology. 32:658-663, 1972.
2. Zivin, J.A., Snarr, J.F. *Glucose and d(-)-3-hydroxybutyrate uptake by isolated perfused rat brain.* J. Appl. Physiol. 32:664-668, 1972.
3. Zivin, J.A., Snarr, J.F. *An automated calorimetric method for the measurement of 3-hydroxybutyrate concentration.* Anal. Biochem. 52:456-461, 1973.
4. Kizer, J.S., Palkovits, M., Zivin, J.A., Brownstein, M., Saavedra, J.M., Kopin, I.J. *The effect of endocrinological manipulations on tyrosine hydroxylase and dopamine-beta-hydroxylase activities in individual hypothalamic nuclei of the adult male rat.* Endocrinology 96:779-812, 1974.
5. Kizer, J.S., Zivin, J.A., Jacobowitz, D.M., Kopin, I.J. *The nycto-hemeral rhythm of plasma prolactin: Effects of ganglionectomy, pinealoectomy, constant light, constant darkness, or 6-OH-dopamine administration.* Endocrinology 96:1230-1240, 1975.

6. Kizer, J.S., Zivin, J.A., Saavedra, J.M., Brownstein, M. *A sensitive microassay for tryptophan hydroxylase in brain.* J. Neurochem. 24:779-785, 1975.
7. Reid, J.L., Zivin, J.A., Foppen, F.H., Kopin, I.J. *Catecholamine neurotransmitters and synthetic enzymes in the spinal cord of the rat.* Life Sci. 16:975-984, 1975.
8. Kizer, J.S., Kopin, I.J., Zivin, J.A. *Estimates of catecholamine turnover rates in individual hypothalamic nuclei of the rat by use of alpha-methyl-para-tyrosine.* Brit. J. Pharmacol. 54:243P, 1975.
9. Zivin, J.A., Reid, J.L., Saavedra, J.M., Kopin, I.J. *Quantitative localization of biogenic amines in the spinal cord.* Brain Res. 99:293-301, 1975.
10. Reid, J.L., Zivin, J.A., Kopin, I.J. *Central and peripheral adrenergic mechanisms in the development of deoxycorticosterone saline hypertension in rats.* Circ. Res. 37:569-579, 1975.
11. Saavedra, J.M., Palkovits, M., Kizer, J.S., Brownstein, M., Zivin, J.A. *Distribution of biogenic amines and related enzymes in the rat pituitary gland.* J. Neurochem. 25:257-260, 1975.
12. Zivin, J.A., Reid, J.L., Tappaz, M.L., Kopin, I.J. *Quantitative localization of tyrosine hydroxylase dopamine-beta-hydroxylase, phenylethanolamine-N-methyltransferase, and glutamic acid decarboxylase in spinal cord.* Brain Res. 105:151-156, 1976.
13. Zivin, J.A., Bartko, J.J. *Statistics for disinterested scientists.* Life Sci. 18:15-26, 1976.
14. Zivin, J.A., Doppman, J.L., Reid, J.L., Tappaz, M.L., Saavedra, J.M., Kopin, I.J., Jacobowitz, D.M. *Biochemical and histochemical studies of biogenic amines in spinal cord trauma.* Neurology 26:99-107, 1976.
15. Doppman, J.L., Zivin, J.A. *A rapid non-operative technique for producing spinal cord injury in animals.* Invest. Radiol. 11:150-151, 1976.
16. Saavedra, J.M., Zivin, J.A. *Tyrosine hydroxylase and dopamine beta-hydroxylase: Distribution in discrete areas of the rat limbic system.* Brain Res. 105:517-524, 1976.
17. Roizen, M.F., Kopin, I.J., Thoa, M.B., Zivin, J.A., Muth, E.A., Jacobowitz, D.J. *The effect of two anesthetic agents on norepinephrine and dopamine in discrete brain nuclei, fiber tracts, and terminal regions of the rat.* Brain Res. 110:515-522, 1976.
18. Reid, J.L., Zivin, J.A., Kopin, I.J. *The effect of spinal cord trans-section and intracisternal 6-hydroxy-dopamine on phenylethanolamine-N-methyl transferase (PNMT) activity in rat brainstem and spinal cord.* J. Neurochem. 26:629-631, 1976.

19. Tappaz, M.L., Zivin, J.A., Kopin, I.J. *Intraspinal glutamic decarboxylase distribution after trans-section of the cord at the thoracic level.* Brain Res. 111:220-223, 1976.
20. Saavedra, J.M., Grobecker, H., Zivin, J.A. *Catecholamines in the raphe nuclei of the rat.* Brain Res. 114:339-345, 1976.
21. Zivin, J.A. *Lateral cervical puncture: An alternative to lumbar puncture.* Neurol. 28:616-618, 1978.
22. Roizen, M.F., Moyers, J.R., Zivin, J.A., Wilkinson, P.L., Lake, C.R., Hamilton, W.K., Chatterjee, K., Horrigan, R.W. *Predictability of the change in plasma norepinephrine concentration in one vascular bed knowing the change in plasma norepinephrine in another vascular bed.* In: Catecholamines: Basic and Clinical Frontiers. E. Usdin, I.J. Kopin, J. Barchas, eds. New York: Pergamon Press, 1979, pp.930-932.
23. Zivin, J.A., DeGirolami, U. *Spinal cord infarction: A highly reproducible stroke model.* Stroke 11:200-202, 1980.
24. Zivin, J.A., DeGirolami, U. *A new approach in the experimental investigation of stroke.* Trans. Am. Neurol. Assoc. 105:161-162, 1980.
25. DeGirolami, U., Zivin, J.A. *Neuropathology of experimental spinal cord ischemia in the rabbit.* J. Neuropath. Exp. Neurol. 41:129-149, 1982.
26. Zivin, J.A., DeGirolami, U., Hurwitz, E.L. *A quantitative study of the spectrum of neurological deficits in experimental nervous system ischemia.* Arch. Neurol. 39:408-412, 1982.
27. Zivin, J.A., Waud, D.R. *How to analyze binding, enzyme and uptake data: The simplest case, a single phase.* Life Sci. 30:1407-1422, 1982.
28. Zivin, J.A., Waud, D.R. *A precise and sensitive method for measurement of spinal cord blood flow.* Brain Res. 258:197-200, 1983.
29. Zivin, J.A., Stashak, J.A. *The effect of ischemia on biogenic amine concentrations in the central nervous system.* Stroke 14:556-562, 1983.
30. Chad, D.A., Bradley, W.G., Rasool, C., Good, P., Reichlin, S., Zivin, J.A. *Sympathetic postganglionic unmyelinated axons in the rat peripheral nervous system.* Neurology 33:841-847, 1983.
31. Faden, A.I., Jacobs, T.P., Smith, G.P., Green, B., Zivin, J.A. *Neuropeptides in spinal cord injury: Comparative experimental models.* Peptides 4:631-634, 1983.

32. Faden, A.I., Jacobs, T.P., Zivin, J.A. *Comparison of naloxone and a delta-selective antagonist in experimental spinal stroke.* Life Sci. 33 (Sup.1):707-710, 1983.
33. Zivin, J.A., Venditto, J.A. *Experimental CNS ischemia: Serotonin antagonists reduce or prevent damage.* Neurology 34:469-474, 1984.
34. Faden, A.I., Jacobs, T.P., Smith, M.T., Zivin, J.A. *Naloxone in experimental spinal cord ischemia: Dose-response studies.* Eur. J. Pharmacol. 103:115-120, 1984.
35. Zivin, J.A. *Cyproheptadine reduces or prevents ischemic central nervous system damage.* Neurology 35:584-587, 1985.
36. Russell, D., Fisher, M., Zivin, J.A., Sullivan, J., Drachman, D.A. *Status epilepticus and Epstein-Barr virus encephalopathy.* Arch. Neurol. 42:789-793, 1985.
37. Yatsu, F.M., Zivin, J.A. *Hypertension in acute ischemic strokes: Not to treat.* Arch. Neurol. 42:999-1000, 1985.
38. Zivin, J.A., Fisher, M., DeGirolami, U., Hemenway, C.C., Stashak, J.A. *Tissue plasminogen activator reduces neurological damage after cerebral embolism.* Science 230:1289-1292, 1985.
39. Chad, D.A., Zivin, J.A. *Coma in the intensive care unit.* In: Textbook of Intensive and Coronary Care Medicine. J. Rippe, J. Alpert, J. Dalen, R. Irwin, eds. Boston: Little, Brown, 1985, pp.1036-1044.
40. Zivin, J.A., DeGirolami, U. *Studies of the influence of biogenic amines on central nervous system ischemia.* Stroke 17:509-516, 1986.
41. Zivin, J.A., Waud, D.R. *Analysis of one component saturable systems such as ligand binding enzyme kinetic and transport data.* J. Pharmacol. Methods 16:1-22, 1986.
42. Chad, D.A., DeGirolami, U., Zivin, J.A. *Motor fibers in the sural nerve.* Acta Pathol. 71:338-340, 1986.
43. Lyden, P.D., Zivin, J.A., Soll, M., Sitzer, M., Rothrock, J.F., Alksne, J. *Intracerebral hemorrhage after experimental embolic infarction: Anticoagulation.* Arch. Neurol. 44:848-850, 1987.
44. Zivin, J.A., DeGirolami, U., Kochhar, A., Lyden, P.D., Mazzarella, V.A., Hemenway, C.C., Henry, M.E. *A model for quantitative evaluation of embolic stroke therapy.* Brain Res. 435:305-309, 1987.

45. Zivin, J.A. *Serotonin antagonists reduce central nervous system ischemic damage*. In: Pharmacological Approaches to the Treatment of Brain and Spinal Cord Injury. D.G. Stein, B. Sable, eds. New York: Plenum Press, 1988, pp.75-88.
46. Kochhar, A., Zivin, J.A., Lyden, P.D., Mazzarella, V.A. *Glutamate antagonist therapy reduces neurological deficits produced by focal central nervous system ischemia*. Arch. Neurol. 45:148-153, 1988.
47. Lyden, P.D., Alving, L., Zivin, J.A., Rothrock, J.F. *Hemodilution with low-molecular weight hetastarch after experimental focal cerebral ischemia*. Stroke 19:223-227, 1988.
48. Zivin, J.A., Lyden, P.D., DeGirolami, U., Kochhar, A., Mazzarella, V.A., C. Hemenway, Johnston, P. *Tissue plasminogen activator reduces neurologic damage after experimental embolic stroke*. Arch. Neurol. 45:387-391, 1988.
49. Lyden, P.D., Zivin, J.A., Kochhar, A., Mazzarella, V.A. *The effects of calcium channel blockers on neurological outcome following reversible and irreversible focal CNS ischemia*. Stroke 19:1020-1026, 1988.
50. Zivin, J.A., Kochhar, A., Saitoh, T. *Phenothiazines reduce ischemic damage to the central nervous system*. Brain Res. 482:189-193, 1989.
51. Lyden, P.D., Zivin, J.A., Clark, W.M., Madden, K.P., Sasse, K.C., Mazzarella, V.A., Terry, R.D., Press, G.A. *Tissue plasminogen activator mediated thrombolysis of cerebral emboli and its effects on hemorrhagic infarction in rabbits*. Neurology 39:703-708, 1989.
52. Zivin, J.A. *A perspective on the future of thrombolytic stroke therapy*. In: Cerebrovascular Diseases: Sixteenth Research (Princeton) Conference. M.D. Ginsberg, W.D. Dietrich, eds. New York: Raven Press, 1989, pp.33-37.
53. Cole, D.J., Shapiro, H.M., Drummond, J.C., Zivin, J.A. *Halothane, fentanyl/nitrous oxide, and spinal lidocaine protect against spinal cord injury in the rat*. Anesthesiology 6:967-972, 1989.
54. Kochhar, A., Saitoh, T., Zivin, J.A. *Reduced protein kinase C activity in ischemic spinal cord*. J. Neurochem. 53:946-952, 1989.
55. Wieloch, T., Cardell, M., Saitoh, T., Zivin, J.A. *Protein kinase C is translocated to the plasma membrane during cerebral ischemia, but is partially inactivated*. In: Neurotransmission and Cerebrovascular Function, Volume I. J. Seylaz and E.T. MacKenzie, eds. New York: Elsevier Science Publishers, B.V., 1989, pp.481-484.
56. Zivin, J.A. *Thrombolytic therapy for stroke*. In: Protection of the Brain from Ischemia, Volume 3. P.R. Weinstein and A.I. Faden, eds. Baltimore: Williams and Wilkins, 1990, pp.231-236.

57. Zivin, J.A., Kochhar, A., Saitoh, T. *Protein phosphorylation during ischemia*. Stroke 21(suppl):III117 - III121, 1990.
58. Zivin, J.A., Grotta, J.C. *Animal stroke models: They are relevant to human disease*. Stroke 21:981-983, 1990.
59. Lyden, P.D., Madden, K.P., Clark, W.M., Sasse, K.C., Zivin, J.A. *Incidence of cerebral hemorrhage after treatment with tissue plasminogen activator or streptokinase following embolic stroke in rabbits*. Stroke 21:1589-1593, 1990.
60. Madden, K.P., Clark, W.M., Marcoux, R.W., Probert, A.W., Weber, M.J., Rivier, J., Zivin, J.A. *Treatment with conotoxin, an "N-type" calcium channel blocker, in neuronal hypoxic-ischemic injury*. Brain Res. 537:256-262, 1990.
61. Cardell, M., Bingren, H., Wieloch, T., Zivin, J.A., Saitoh, T. *Protein kinase C is translocated to cell membranes during cerebral ischemia*. Neurosci. Lett. 119:228-232, 1990.
62. Zivin, J.A. *Experimental therapeutics of anoxic-ischemic encephalopathy*. In: Neurology in Clinical Practice. W.G. Bradley, R.B. Daroff, G.M. Fenichel, C.D. Marsden, eds. New York: Butterworth Publishers, 1991, pp.1359-1364.
63. Madden, K.P., Clark, W.M., Kochhar, A., Zivin, J.A. *Effect of protein kinase C modulation on outcome of experimental CNS ischemia*. Brain Res. 547:193-198, 1991.
64. Zivin, J.A. *Coma*, In: Introduction to Clinical Medicine. H.L. Greene, R.J. Glasscock, M.A. Kelley, eds. Philadelphia: B.C. Decker, 1991, pp.419-420.
65. Russell, D., Madden, K.P., Clark, W.M., Sandset, P.M., Zivin, J.A. *The detection of arterial emboli using Doppler ultrasound*. Stroke 22:253-258, 1991.
66. Kochhar, A., Saitoh, T., Zivin, J.A. *Spinal cord ischemia reduces calcium/calmodulin-dependent protein kinase activity*. Brain Res. 542:141-146, 1991.
67. Wieloch, T., Cardell, M., Bingren, H., Zivin, J.A., Saitoh, T. *Changes in the activity of protein kinase C and the differential subcellular redistribution of its isozymes in the rat striatum during and following transient forebrain ischemia*. J. Neurochem. 56:1227-1235 1991.
68. Clark, W.M., Madden, K.P., Lyden, P.D., Zivin, J.A. *Cerebral hemorrhagic risk of aspirin or heparin therapy with thrombolytic treatment in rabbits*. Stroke 22:872-876, 1991.
69. Clark, W.M., Madden, K.P., Lyden, P.D., Zivin, J.A. *Reduction of central nervous system ischemic injury by monoclonal antibody to intercellular adhesion molecule*. J. Neurosurgery 75(4):623-627, 1991.

70. Clark, W.M., Madden, K.P., Rothlein, R., Zivin, J.A. *Reduction of central nervous system ischemic injury in rabbits using leukocyte adhesion antibody treatment*. Stroke 22:877-883, 1991.
71. Zivin, J.A., Choi, D. *Stroke therapy*. Sci. Am. 265:56-63, 1991.
72. Kochhar, A., Zivin, J.A., Mazzarella, V. *Pharmacologic studies of the neuroprotective actions of a glutamate antagonist in ischemia*. J. Neurotrauma 8:175-186, 1991.
73. Zivin, J.A., Mazzarella, V. *Tissue plasminogen activator plus glutamate antagonist improves outcome after embolic stroke*. Arch. Neurol. 48:1235-1238, 1991.
74. Madden, K.P., Clark, W.M., Kochhar, A., Zivin, J.A. *Efficacy of LY233053, a competitive glutamate antagonist, in experimental central nervous system ischemia*. J. Neurosurgery 76:106-110, 1992.
75. Lyden, P.D., Zivin, J.A., Chabolla, D.R., Jacobs, M.A., Gage, F.H. *Quantitative effects of cerebral infarction of spatial learning in rats*. Exper. Neurol. 116:122-132, 1992.
76. Russell, D., Madden, K.P., Clark, W.M., Zivin, J.A. *Tissue plasminogen activator induced cerebral thrombolysis: Assessment of different dose-rates using Doppler ultrasound*. Stroke 23:388-393, 1992.
77. Zivin, J.A., Waud, D.R. *Quantal bioassay and stroke*. Stroke 23:767-773, 1992.
78. Kase, C.S., Pessin, M.S., Zivin, J.A., del Zoppo, G.J., Furlan, A.J., Buckley, J.W., Snipes, R.G., Littlejohn, J.K. *Intracranial hemorrhage after coronary artery thrombolysis with tissue plasminogen activator*. Am. J. Med. 92:384-390. 1992.
79. del Zoppo, G.L., Poeck, K., Pessin, M.S., Wolpert, S.M., Furlan, A.J., Ferbert, A., Alberts, M.J., Zivin, J.A., Wechsler, L., Busse, O., Greenlee, R. Jr., Brass, L., Mohr, J.P., Feldmann, E., Hacke, W., Kase, C.S., Biller, J., Gress, D., Otis, S.M. *Recombinant tissue plasminogen activator in acute thrombotic and embolic stroke*. Ann. Neurol. 32:78-86, 1992.
80. Zivin, J.A. *Animal Models of Ischemia*. In: Emerging Strategies in Neuroprotection. P.J. Marangos, H. Lal, eds. Boston: Birkhauser, 1992, pp.57-75.
81. Russell, D., Brucher, R., Madden, K.P., Clark, W.M., Sandset, P.M., Zivin, J.A. *The intensity of the Doppler signal caused by arterial emboli depends on embolus size*. In: M. Oka, G.M. von Reutern, H. Furuhata, K. Kodaira, eds. Recent Advances in Neurosonology. Amsterdam: Excerpta Medica, 1992, pp.57-60.

82. Lyden, P.D., Zivin, J.A. *Hemorrhagic transformation after cerebral ischemia: Mechanisms and incidence*. Cerebrovascular and Brain Metabolism Reviews. 5:1-16, 1993.
83. Thomas, G.R., Thibodeaux, H., Bennett, W.F., Refino, C.J., Badillo, J.M., Errett, C.J., Zivin, J.A. *Optimized thrombolysis of cerebral clots with tissue-type plasminogen activator in a rabbit model of embolic stroke*. J. Pharm. Exp. Ther. 264:67-73, 1993.
84. Bowes, M.P., Zivin, J.A., Rothlien, R. *Monoclonal antibody to the ICAM-1 adhesion site reduces neurological damage in a rabbit cerebral embolism stroke model*. Exp. Neurol. 119:215-219, 1993.
85. Madden, M.D., Clark, W.M., Zivin, J.A. *Delayed therapy of experimental ischemia with competitive N-methyl-D-aspartate antagonists*. Stroke 24:1068-1071, 1993.
86. Wolpert, S.M., Bruckmann, H., Greenlee, R., Wechsler, L., Pessin, M.S., del Zoppo, G.J., and the rt-PA Acute Stroke Study Group. *Neuroradiologic evaluation of patients with acute stroke treated with recombinant tissue plasminogen activator*. Am. J. Neuroradiol. 14:3-13, 1993.
87. Shackelford, D.A., Zivin, J.A. *Renaturation of calcium/calmodulin-dependent protein kinase activity after electrophoretic transfer from sodium dodecyl sulfate-polyacrylamide gels to membranes*. Analytical Biochem. 211:131-138, 1993.
88. Shackelford, D.A., Yeh, R.Y., Zivin, J.A. *Inactivation and subcellular redistribution of Ca²⁺/calmodulin-dependent protein kinase II following spinal cord ischemia*. J. Neurochem. 61:738-747, 1993.
89. Adams, H.P., Jr., Brott, T.G., Crowell, R.M. Furlan, A.J., Gomez, C.R., Grotta, J., Helgason, C.M., Marler, J.R., Woolson, R.F., Zivin, J.A. *Guidelines for the management of patients with acute ischemic stroke: a statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association*. Stroke 25:1901-1914, 1994.
90. Adams, H.P., Jr., Brott, T.G., Crowell, R.M. Furlan, A.J., Gomez, C.R., Grotta, J., Helgason, C.M., Marler, J.R., Woolson, R.F., Zivin, J.A. *Guidelines for the management of patients with acute ischemic stroke: a statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association*. Circulation 90:1588-1601, 1994.
91. Thomas, G.R., Thibodeaux, H., Errett, C.J., Badillo, J.M., Keyt, B.A., Refino, C.J., Zivin, J.A., Bennett, W.F. *A long-half-life and fibrin-specific form of tissue plasminogen activator in rabbit models of embolic stroke and peripheral bleeding*. Stroke 25:2072-2079, 1994.

92. Aronowski, J., Ostrow, P., Samways, E., Strong, R., Zivin, J.A., Grotta, J.C. *Graded bioassay for demonstration of brain rescue from experimental acute ischemia in rats.* Stroke 25:2235-2240, 1994.
93. Bowes, M.P., Masliah, E., Otero, D.A. Zivin, J.A., Saitoh, T. *Reduction of neurological damage by a peptide segment of the amyloid beta/A4 protein precursor in a rabbit spinal cord ischemia model.* Exp. Neurol. 129:112-119, 1994.
94. Shackelford, D.A., Yeh, R.Y., Zivin, J.A. *Detection of protein kinase activity after renaturation of proteins transferred from sodium dodecyl sulfate-polyacrylamide gels to membranes.* In: Cell Biology: A Laboratory Handbook. J.E. Celis, ed. San Diego: Academic Press, 1994, pp.258-263.
95. Bowes, M.P., Burhop, K.E., Zivin, J.A. *Diaspirin cross-linked hemoglobin improves neurological outcome following reversible but not irreversible CNS ischemia in rabbits.* Stroke 25:2253-2257, 1994.
96. Albers, G.W., Atkinson, R.P., Kelley, R.E., Rosenbaum, D.M., Dextrorphan Study Group. *Safety, tolerability, and pharmacokinetics of the N-Methyl-D-Aspartate antagonist dextrorphan in patients with acute stroke.* Stroke 26:254-258, 1995.
97. A Working Group on Emergency Brain Resuscitation. *Emergency brain resuscitation.* Ann. Int. Med. 122:622-627, 1995.
98. Bowes, M.P., Rothlein, R., Fagan, S.C., Zivin, J.A. *Monoclonal antibodies preventing leukocyte activation reduce experimental neurologic injury and enhance efficacy of thrombolytic therapy.* Neurology 45:815-819, 1995.
99. Shackelford, D.A., Yeh, R.Y., Hsu, M., Buzsaki, G., Zivin, J.A. *Effect of cerebral ischemia on calcium/calmodulin-dependent protein kinase II activity and phosphorylation.* J. Cereb. Blood Flow Metab. 15:450-461, 1995.
100. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. *Tissue plasminogen activator for acute ischemic stroke.* N. Engl. J. Med. 333:1581-1587, 1995.
101. A Working Group on Emergency Brain Resuscitation. *Emergency Brain Resuscitation.* Ann. Intern. Med. 122:622-627, 1995.
102. Clark, W.M., Zivin, J.A. *Anti-adhesion molecule monoclonal antibodies.* CNS Drugs 6:90-99, 1996.
103. Bowes, M.P., Zivin, J.A., Thomas, G.R., Thibodeaux, H., Fagan, S.C. *Acute hypertension, but not thrombolysis, Increases the incidence and severity of*

hemorrhagic transformation following experimental stroke in rabbits. Exp. Neurol. 141:40-46, 1996.

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